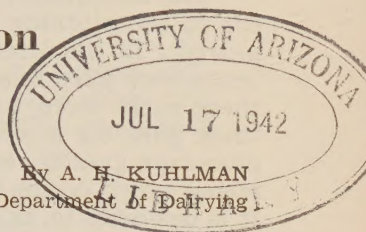


Mungbean Hay and Mungbean Silage for Milk Production



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OKLAHOMA AGRICULTURAL EXPERIMENT STATION

Oklahoma A. and M. College, Stillwater

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Wherever it can be grown successfully, alfalfa is the most popular legume hay because of its large yields and high feeding value. But many Oklahoma farmers who have experienced difficulty in growing alfalfa on thin upland soils have in recent years become interested in the use of mngbeans as a hay crop. While mungbean hay tends to be coarse and stemmy, it does provide a legume roughage under conditions in which alfalfa, soybeans, or other legumes cannot be grown. Mungbeans grow rapidly, are able to withstand unfavorable conditions of drouth and hot weather, and will produce a fair yield on thin upland soils which are unsuitable for growing alfalfa.

Tests of the feeding value of both mungbean hay and mungbean silage have been made by the dairy department of the Oklahoma Agricultural Experiment Station during several seasons. Both the golden mungbean and the green seeded variety were grown as a hay crop; and the golden variety was also tested as a silage crop.

The golden mungbean was ready for harvesting between 100 and 120 days after planting, while the green variety reached the cutting stage in 60 to 70 days after planting.

When used either as a hay or as silage, the mungbeans were cut when the pods were well developed and only a few pods had become brown in color.

TESTS WITH MUNGBEAN HAY

The best quality of hay was obtained when the beans were cut in the morning of a clear day after the dew had disappeared. In the afternoon or the following morning the wilted beans were piled in small cocks. During wet or cloudy weather these cocks were turned every second day. After curing in these piles for a week, the hay was baled in the field. This procedure greatly reduced the loss of leaves and pods by shattering which occurs if the hay is allowed to cure in the swath. It is desirable to bale the hay in the morning, because a considerable loss of leaves will occur if the hay is brittle.

Two feeding trials with milk cows have been conducted with hay made from each of the two varieties named above. The results of these experiments indicate that if only the hay actually consumed is considered, mungbean hay was practically equal to No. 1 alfalfa hay. However, considerable amounts of the coarser portions of the stalks of the mungbean were not consumed by some of the cows. Since the farmer is interested in the feeding value of the entire crop which he produces, the results given here are based on the actual amounts of hay offered.

On this basis it was necessary in each of the two trials to feed 133 pounds of hay made from the golden mungbean to replace 100 pounds of No. 1 alfalfa hay. This means that this hay was worth about 75 percent as much as No. 1 alfalfa hay.

In the first of these trials the mungbeans were cut and tied in bundles with a corn binder, cured in shocks and then stacked. When these bundles were fed, 29.8 percent of the stack-run of hay was refused by the cows. In the other experiment with hay made from the same variety of mungbeans, but cured and baled as described earlier in this discussion, 16.5 percent of the baled hay was refused.

Hay made from green mungbeans is finer-stemmed than hay of the golden mungbeans. In each of two feeding trials the cows refused 8.7 percent and 10.8 percent respectively of the hay offered. In these trials, 119 and 109 pounds of mungbean hay respectively were equivalent to 100 pounds of No. 1 alfalfa hay. This means that these two lots of hay were worth 84 percent and 90 percent respectively as much as the alfalfa hay with which they were compared.

RESULTS.—The results indicate that mungbeans have considerable merit as an annual or emergency hay crop when other legumes are not available. They also emphasize the importance of proper harvesting and curing of the crop in order to reduce the amount of hay wasted at feeding time due to coarseness of stems and loss of leaves.

TESTS WITH MUNGBEAN SILAGE

The results of three feeding trials with milk cows indicate that mungbeans have considerable merit as a silage crop under conditions which are not favorable for the production of crops usually grown for this purpose.

During the severe drouths of 1934 and 1936, when most crops were failures in this state, golden mungbeans (*Phaseolus aureus*) grown on the College Dairy Farm attained a height of 2 to 2½ feet. In more favorable seasons on the same field, this variety grew to the height of 3 to 4 feet. In 1934, the mungbeans were quite mature at the time of harvesting and had produced very few pods. In 1936, many pods developed but only a small percentage were mature when the crop was harvested. Mungbeans grown in 1937 and 1938 produced a fair amount of pods.

Each year the crop was cut with a grass mower, run through a silage cutter, and ensiled in an upright tile silo. Silage of good quality was obtained each season. The silage packed much more firmly than either corn or sorghum silage. It did not have the strong odor usually associated with legume silage and was very palatable. No difficulty was encountered in getting cows accustomed to consume it. Although it has been found necessary to add molasses or mineral acids to crops like alfalfa or soybeans in order to obtain a good quality of silage from them, nothing was added to the mungbeans at the time of filling the silo to aid in preserving them. The use of mungbeans as a silage crop thus eliminates the cash expenditure for molasses and acids which also may be difficult to obtain during the war period.

The feeding value of mungbean silage for milk production was determined in three 90-day feeding trials in which mungbean silage replaced one-half of the daily allowance of No. 1 alfalfa hay fed with a suitable concentrate mixture. The check ration consisted of alfalfa hay fed each cow at the rate of 2 pounds of hay daily for each 100 pounds of body weight and concentrates in accordance with her requirements for body maintenance and milk production. The concentrate mixture fed all cows consisted of ground corn 400 pounds, ground oats 200 pounds, wheat bran 200 pounds and cottonseed meal (43%

protein) 100 pounds. On the experimental ration each cow received 1 pound of alfalfa hay and 3 pounds of mungbean silage daily for each 100 pounds body weight, and concentrates as on the check ration.

No significant differences in milk yields were obtained from the two rations, although in each trial the average daily yield of 4 percent milk was slightly in favor of the silage ration.

RESULTS. — The average results of the three tests, using 28 cows were:

	Alfalfa hay ration	Mungbean silage ration
Average daily yield of 4% Milk, lbs.	30.5	31.0
Feed consumed per 100 lbs. 4% Milk:		
Alfalfa Hay, lbs.	66.7	33.2
Mungbean Silage, lbs.	----	93.9
Concentrates, lbs.	38.1	37.0

In these trials, 100 pounds of alfalfa hay were replaced by 263, 265, and 276 pounds of mungbean silage. Using mungbeans as a silage crop rather than a hay crop eliminates losses of leaves in curing and the losses due to refusal of cows to eat the coarser stalks.

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